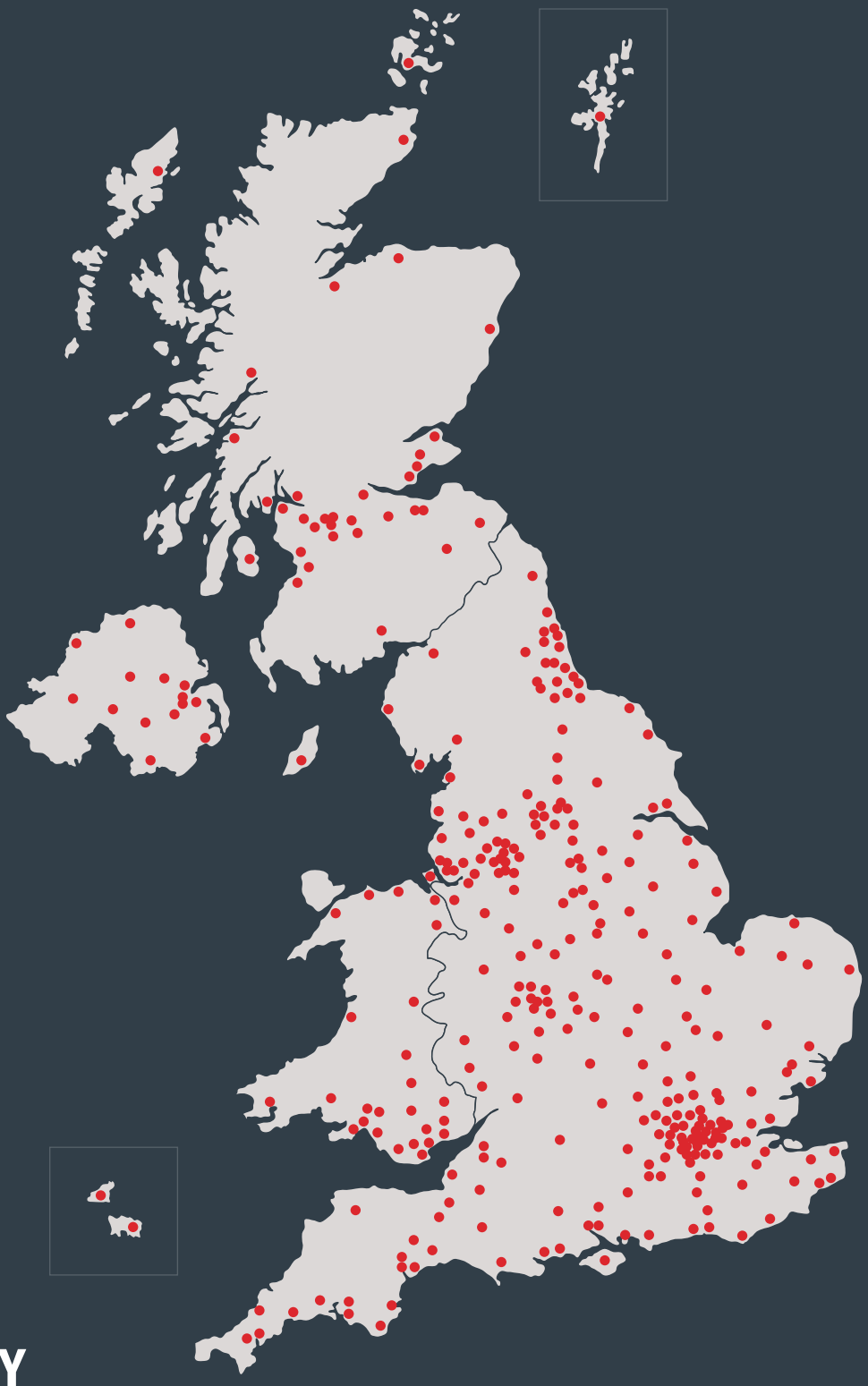
British Heart Foundation

THE NATIONAL AUDIT OF CARDIAC REHABILITATION ANNUAL STATISTICAL REPORT 2014



FIGHT FOR EVERY HEARTBEAT

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Cover image
The cover shows the Cardiac Rehabilitation programmes of England, Northern Ireland, Scotland and Wales.

Published by the British Heart Foundation, Greater London House, 180 Hampstead Road, London NW1 7AW

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Registered charity in England and Wales (225971) and in Scotland (SC039426)

ACKNOWLEDGEMENTS

The National Audit of Cardiac Rehabilitation (NACR) is a British Heart Foundation (BHF) project which aims to ensure that patients with cardiovascular disease achieve the best possible outcomes following a cardiac event. The NACR has supported over 300 programmes to enter clinical data for over 75,000 patients in the last year alone. The National Audit team is grateful for the continued support from the BHF and welcomes their new strategy which reaffirms its commitment to supporting the NHS to deliver high-quality services aimed at optimising outcome for people with cardiovascular disease.

The British Association for Cardiovascular Prevention and Rehabilitation (BACPR) is a formidable ally with a shared ambition to ensure that all CR programmes in the UK are, at the very least, carried out to a basic minimum standard that is known to benefit patients. We look forward to working even closer with the BACPR and its members as part of our collaborative national certification programme.

Thanks also to the Health and Social Care Information Centre (HSCIC) team for their support and expertise in redesigning the audit and supporting the NACR to achieve high quality data governance. The HSCIC shares our desire to use audit data to reduce inequalities and improve services for the betterment of patients.

The National Audit team would like to thank patients for agreeing to take part in the audit and for completing the clinical assessments and questionnaires before and after their programme. Our gratitude extends to the 300 plus cardiac rehabilitation (CR) teams who, in collaboration with patients and carers, have helped over 600 patients to stop smoking, improved risk factor management, increased exercise frequency and improved psychosocial well-being for tens of thousands of patients in the last 12 months.

We would very much like to thank the NACR Steering Committee for their continued support and expertise in shaping recent developments. They are:

Professor Nick Black (NACR Audit Adviser), Mel Clark (Patient Representative), Frances Divers (Scotland Representative, NHS Lothian), Dr Jane Flint (Cardiologist), Professor Gill Furze (BACPR President), Dr Chris Gale (MINAP Audit Representative), Julie Henderson (Head of Analytical Services, HSCIC), Suzanne Indge (NACR Lead for the All Wales Cardiac Rehab Group), Catherine Kelly (BHF) Dr Mike Knapton (BHF), Alana Laverty (Northern Ireland Representative), Dr Gordon McGregor (BACPR Audit Representative), Dr Joe Mills (Incoming President BACPR and Cardiologist), Julie Thomas (Chair of the All Wales Cardiac Rehab Group), Irene Thomson (Scotland Representative, NHS Lothian), Iain Todd (Scotland Representative, NHS Lothian), Dr Sally Turner (NACR User Representative) and Alyson Whitmarsh (Programme Manager, Audit Support Unit, HSCIC).

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FOREWORD BY THE BRITISH HEART FOUNDATION (BHF)

The BHF welcomes the new approach from the National Audit of Cardiac Rehabilitation (NACR) which focuses on generating data to help inform commissioning decisions and drive up the quality of provision and outcome for patients attending cardiac rehabilitation. This year's annual report adopts a new approach to reporting the data from cardiac rehabilitation programmes, which demonstrates some success but at the same time highlights areas for improvement.

The good news is that more than 77,000 patients attended cardiac rehabilitation in the last year which represents an overall uptake of 45%. The range in uptake went from an impressive 80% for bypass surgery patients to as low as 33% uptake in patients medically managed following myocardial infarction. For the majority the outcome from attending a programme translated into improvements in exercise status, psychosocial well-being, blood pressure and cholesterol control and health related quality of life. Changes in Body Mass Index (BMI) were less favourable across all Health Regions which may be partly explained by programmes being much shorter than the evidence-based programme specifications.

The low uptake in patients following MI (33%) and elective percutaneous coronary intervention (40%) is of particular concern across all regions of England, Wales and Northern Ireland. Acute cardiological management of heart attacks is changing with percutaneous coronary interventions now representing around 50% of all interventions for myocardial infarction. This type of approach in cardiology reduces the time to identify and recruit patients to a cardiac rehabilitation programme. This is likely to become even more challenging in future as, based on 2013 British Cardiac Intervention Society (BCIS) data, 25,000 patients underwent percutaneous coronary intervention as a day-case procedure last year. This figure will rise over the new few years and will require a concerted effort from local cardiac rehabilitation programmes and Health Regions to keep pace.

The NACR approach to reporting performance on key service indicators and benchmarking services against evidence-based guidelines is a real strength. This approach shows marked differences across the 19 Health Regions particularly for Strategic Clinical Networks in England which fall short of recommended service specifications for the timing and duration of rehabilitation.

The BHF plans to work with the NACR to help support Health Regions to commission services that meet the evidence base and yield optimal outcomes for patients.

Dr Mike Knapton
Associate Medical Director British Heart Foundation

FOREWORD BY THE BRITISH ASSOCIATION FOR CARDIOVASCULAR PREVENTION AND REHABILITATION (BACPR)

The BACPR is very grateful to the NACR team and the BHF for supporting cardiovascular rehabilitation (CR) teams to complete such a patient-focussed audit.

In previous NACR reports the emphasis was on uptake, which remains important as a measure of CR performance. In this report there are some very good results for uptake with, on average, 80% of coronary artery bypass patients taking up CR across the UK. The situation is also promising for myocardial infarction with percutaneous coronary interventions (MI+PCI) with CR uptake climbing above 50%. Such levels of uptake lead European league tables but the UK cannot be complacent as uptake to CR following medically managed myocardial infarction (post MI) or following elective PCI is not so good with only 33 to 40% uptake respectively. Variation between countries is evident most notably for elective PCI in Northern Ireland at only 16% and post MI uptake in Wales at 22%. The BACPR continues to work with national associations to reverse these trends.

While uptake is an important indicator for CR, in the new commissioning landscape it is almost more important to demonstrate that CR is effectively and equitably delivered. This 2014 NACR report is landmark – as, for the first time, it reports cardiac rehabilitation outcomes at regional level. These data show a very worrying variability between regions in such key indicators as time from referral to commencement of CR, (with only two regions meeting the guidance of 28 days for post MI), and percent of patients with a baseline assessment (varies from 30% to 93%). Data for assessment at completion of CR varies from a very poor 10% to a not much better 33% across the 19 Health Regions. These very large differences between the regions are illuminating, as they demonstrate inequality of provision across the UK. They also show that, in order for CR to be able to demonstrate that it is effective, we must alert CR programmes across the UK to the importance of undertaking (and recording) an assessment at completion of CR. The variability in findings demonstrates the need to support some programmes to increase quality of provision to match the top-performing programmes. It is not only the data itself that is variable, the number of programmes which link into the NACR and record their data is also patchy, with only 13% of programmes in the North-East of England inputting data into the NACR, compared to 100% across Northern Ireland. This has meant that it has not been possible to assess some of the outcomes across the North-East of England, as the numbers are too small.

In recognition of the increasing importance for CR across the UK to demonstrate to commissioners its effectiveness and equity of delivery, BACPR has teamed up with NACR in a joint enterprise to develop a programme to certify that CR programmes meet the minimum BACPR standards. The input of NACR into this process is key - it is beyond the administrative capabilities of BACPR to assess the quality of programmes not inputting data into NACR. Using NACR data will ensure standardisation of outcome measures and increase the transparency of the process. Certification is currently being piloted with volunteer programmes. We aim to complete piloting early next year and to launch the CR certification programme June 2015. This important 2014 NACR report will form the baseline against which we hope to be able to track improvements in CR over the next few years.

Prof Gill Furze
President BACPR

NACR EXECUTIVE SUMMARY

Welcome to the 8th annual statistical report on cardiac rehabilitation (CR) for the UK showing that 12,000 more patients completed CR in 2013 compared to when the audit started in 2007. The UK continues to demonstrate world-leading uptake figures for patients following bypass surgery (over 80% uptake) and positive changes in pre and post CR outcomes for men and women attending CR. However, significant shortfalls still exist in CR uptake for certain patient groups. This is especially the case for the traditional post MI patient group and for patients undergoing elective percutaneous coronary interventions (PCI) with fewer than 40% of eligible patients accessing CR. The situation is worse for patients with heart failure with fewer than 4% (2,346) of all patients registered on the NACR having a primary diagnosis of heart failure.

For the 77,590 patients with data entered in the NACR for 2012-2013 there was, on average, positive changes in physical activity status, psychosocial well-being, blood pressure and cholesterol control and health related quality of life across the 19 health regions of England, Wales and Northern Ireland. Changes in weight, waist circumference and BMI were modest for some regions but poor in other regions which can be partly explained by poor adherence to evidence-based programme specifications. For instance the waiting time for starting the core delivery of CR is too long, too few programmes assess their patients and the duration of the exercise phase of CR is shorter than that recommended by clinical guidance.

Using the 2014 NACR findings there is clear evidence of good practice and outcomes across the UK but at the same time many CR programmes are not meeting basic minimum standards. This situation requires urgent action in the form of service redesign and innovation aimed at aligning services with national guidance and evidence-based practice. More emphasis should be placed on recruiting and assessing a greater number of eligible patients, and commencing a tailored and timely CR intervention with a follow up assessment at the end of CR. Albeit the majority of patients complete CR there is still a significant number that drop out prematurely. This fails to meet the original goals of patients and will have implications for CR programmes in that future quality indicator and funding models are likely to be defined by CR completion rates.

Through our new online data entry system, tailored clinical reports and an emphasis on quality service indicators, the NACR is now well-positioned to monitor service change and support clinical teams. Working with the BHF, the BACPR and national groups from each of the nations, this year's audit will act as the baseline from which to support all CR programmes in achieving and verifying an evidence-based minimum standard across the UK.

We wish to thank CR teams for their efforts in the delivery of services to patients and for supplying data to the NACR which is essential to achieving our shared aim of high-quality CR.

Report author: Professor Patrick Doherty (Director of the NACR)

Supported by the National Audit Team:

- Corinna Petre, NACR Project Manager
- Nerina Onion, NACR Training and Information Officer
- Veronica Dale, Research Fellow in Statistics
- Karen Cardy, Audit and Research Secretary

The BHF National Audit is hosted at the Department of Health Sciences, University of York, UK.

For further information and contact details please visit our webpage:
British Heart Foundation Cardiac Care and Education Research Group
www.cardiacrehabilitation.org.uk.

Part one

INTRODUCTION AND METHODS

INTRODUCTION AND METHODS

The National Audit of Cardiac Rehabilitation (NACR) continues to be an essential part of local and national quality assurance, which is achieved through monitoring performance of CR programmes against key services indicators and expected patient outcomes. This role has evolved to being much more than producing annual reports as it now involves generating routine reports used by clinicians, providers and commissioners to evaluate service provision.

Austerity measures over recent years have hit NHS services hard, with most programmes having to see more patients without increases in staffing or service resources. This could be seen as a positive innovation in that programmes could become more efficient, however it could also mean that programmes are offering services that fail to meet guideline recommendations for how CR should be delivered. Although modern clinical trials in the USA, Canada, Australia and mainland Europe have concluded in favour of CR, the 'resource and delivery gap' between well-funded clinical trials and routine practice remains a challenge. This situation may impact negatively on patient outcomes (Doherty and Lewin 2012, Wood 2012, West et al 2011). Evidence from routine clinical practice shows that CR is (1) being delivered later than recommended (2) is not underpinned by pre and post assessment and (3) is shorter in duration than the evidence would suggest (Heran et al 2011, NICE 2013) and much less, in duration, when compared to European CR programmes (Piepoli et al 2012, Vanhees et al 2012).

This is a milestone year for the national audit where the emphasis will be less about reporting detail on uptake to services and much more about identifying how well CR programmes are performing against evidence-based criteria. This approach will feed into commissioning decisions, promote good practice, support service improvement, and highlight innovative service redesign operating within the evidence base. To help achieve the above the NACR has tightened up on data quality procedures to align with NICE guidance and the emerging NHS commissioning and accountability frameworks. The national audit will, for the first time, report key clinical indicators and patient outcomes nationally and for 19 clinical regions across Wales, Northern Ireland and England. This is the first of a three staged approach starting with regional reporting across the UK in 2014 followed by Clinical Commissioning Group reporting in England in 2015, and finally leading to 'CR programme level' reporting of key indicators and patient outcomes, across the UK, by the autumn of 2016. The national audit continues to work with the HSCIC to keep pace with data quality and governance requirements which are essential when collecting data from NHS clinical practice.

METHODS FOR COLLECTING DATA FOR NACR ANNUAL REPORT

The new NACR approach to monitoring CR and supporting service improvement is dependent on using the highest quality data from programmes. The NACR has moved away from a volume of data approach to a quality approach with automatic checking and validating which has also reduced the burden of harmonising and cleaning audit data. The expectation of what a good audit should achieve and the health landscape in which the audit now operates has changed forever. Through our work with the HSCIC we have (1) created data entry thresholds (2) removed free text fields (3) introduced robust data checking procedures and (4) aligned reporting with key indicators across regional health boundaries. Based on our new audit platform and improvements in the quality of data entered and reported the NACR 2014 report should be seen as the new baseline for CR in the UK.

NUMBER RECEIVING CR

The number of patients receiving CR was collected using the NACR electronic database and via the postal survey. Where programmes did not provide data (20% for the 2014 report), the numbers were estimated using either the previous year's figures for that site if they confirmed that the service had not changed, or using the median number calculated from those sites that had returned data.

NUMBER ELIGIBLE FOR CR

Uptake was calculated for the three diagnostic groups; myocardial infarction (MI), percutaneous coronary intervention (PCI) and coronary artery bypass surgery (CABG). In order to avoid double counting, patients with an MI and CABG in the same year were counted in the MI group.

ENGLAND

Individual anonymised patient level Hospital Episode Statistics (HES) data was provided by the HSCIC on the number of people with MI, PCI or CABG. Those with death on discharge recorded were excluded.

NORTHERN IRELAND

The Department of Health, Social Services and Public Safety Northern Ireland Statistics provided aggregated data on people discharged alive after having an MI, PCI or CABG.

WALES

Health Solution Wales provided aggregated data on people discharged alive after an MI, PCI or CABG.

APPROVAL PROCESS FOR ACCESSING NHS DATA FOR THE NACR

The NHS is committed to ensuring that all patients receive the highest quality care and achieve similar benefits no matter where they live, and the NACR is tasked with ensuring this is accomplished. This is achieved by comparing data collected by the NACR, ideally from all programmes in the UK, with agreed national 'minimum standards' on how best to deliver CR. The NACR is the only national audit collecting data on the quality of care and clinical outcomes for patients taking part in CR following a heart attack, after bypass surgery or after having a stent inserted into diseased arteries in the heart. To fulfil this role the NACR needs to collect data from routine clinical practice about the type of service offered and the typical benefits patients achieve. To get the best possible picture we ideally need data from all eligible patients who are offered CR. The data the NACR collects serves two purposes. Firstly to support local hospital or community based CR teams to generate their own local reports about patient progress. The second purpose is to enable the national audit to monitor and improve the quality of CR services across the UK. The data seen by the national audit team does not contain personal details for patients; in fact the NACR collects much less data than local CR teams.

The NACR is working hard to protect patient data and confidentiality using appropriate and proportional approval processes. The audit has approval (under Section 251 of the NHS Act 2006) from the Health Research Authority's Confidentiality Advisory Group (CAG) to collect patient identifiable data without explicit consent from individual patients. The challenge of gaining patient consent, to use their data for national audit purposes, is extremely difficult and would create a huge burden on services and staff during the management of a heart attack or immediately following surgery. For this reason the NHS has in place an 'exemption from consent' process where clinical and personal data is entered into NHS systems without explicit consent. Patients are informed about the purposes of the audit and how the information will be used through face to face communication and through the assessment questionnaires that are used to collect data for the audit. There is information on the front of these questionnaires to provide patients with details of why the data is being collected, how it is used, who can see it, and their right to opt out without any effect on their treatment. The Section 251 approval covers the roles of the BHF, HSCIC and the NACR team and ensures the highest quality procedures for collecting, sharing and using only the agreed data about a patient's rehab experience. The approval and the role of the national audit are reviewed each year by CAG.

For more information about the national audit please visit our web page.
British Heart Foundation Cardiac Care and Education Research Group
www.cardiacrehabilitation.org.uk.

Part two

PATIENT THROUGHPUT AND UPTAKE FOR CR

NUMBER OF PROGRAMMES REPORTING IN THE NACR

The number of CR programmes delivering core CR (e.g. phase III or Department of Health Commissioning Pack (DH_CP)) in 2012-2013 is 272 (Table 1). The total number of programmes, based on NACR survey ID numbers and NACR electronic data entry, is 321 across England, Wales and Northern Ireland. There are six fewer programmes compared to last year which reflects (1) joined up reporting between programmes that deliver separate parts of the care pathway (2) mergers between programmes as part of changes in healthcare commissioning, for example through the new Clinical Commissioning Groups (CCGs) and (3) some previously independent full CR programmes are now jointly reporting through one larger CR centre. The national audit continues to be well-placed to map CR provision in the UK and report changes, in CR quality and outcome, within Strategic Clinical Networks (SCNs), CCGs, Hospital Trusts in Ireland, and Cardiac Networks in Wales.

The NACR and BHF have commenced a feasibility study in Scotland, initially with the Lothian Health Board, to investigate the inclusion of Scotland's CR programmes into the NACR in 2015. If successful this will produce a more complete profile of CR in the UK and will be strengthened by the inclusion of Scottish CR programmes which are known, through national and international dissemination, to be accomplished programmes.

Table 1
Patient number and type receiving CR

	Number of patients		
	England	Northern Ireland	Wales
MI	17443	314	932
MI and PPCI/PCI	17248	742	1139
PCI	10795	401	399
CABG	9907	329	491
Heart Failure	2005	18	323
Angina	1705	57	411
Valve Surgery	3876	123	256
Other Surgery	513	4	28
Cardiac Arrest	101	2	5
Pacemaker	132	2	39
ICD	327	7	22
Other	6281	68	461
Unknown	560	17	107
Total	70893	2084	4613
Number of core CR delivery programmes	272	15	24
Number with NACR data	218	15	24
Number estimated	54	0	0
% Estimated	20	0	0

The exclusion of patient groups from CR (Table 2) is partly based on historical practice but also relates to commissioning and funding arrangements for cardiology services which can often specify 'in-scope' and 'non in-scope' patient groups based on diagnoses, treatments and procedures. The most telling values relate to elective PCI, heart failure, patients with an implantable cardioverter defibrillator (ICD) and to a subset of angina patients i.e. those with 'unstable angina'. Inclusion of all four groups is supported by NICE or HTA guidance yet some of these patients are not being offered CR. Programmes not offering CR to in-scope patients should draw on the experience of others who have managed offer CR to all in-scope patient groups. Support is available through the BHF 'Innovative Service Redesign' scheme and the 'Business Tool Kit' which has helped programmes to develop a strong clinical business case. The BHF Alliance is a new initiative that supports clinicians to share their expertise and showcase good service models and approaches for the benefit of NHS services and patients.

http://www.bhf.org.uk/healthcare-professionals/innovative-service-redesign.aspx

Table 2
Patient groups not offered CR

Category	Programmes	% Programmes
Elective PCI	8	3
Heart Failure	31	12
Angina	33	13
Valve Surgery	6	2
Other Surgery	24	9
Cardiac Arrest	31	12
Pacemaker	54	21
ICD	28	11
Other	36	16

UPTAKE TO CR SERVICES IN THE UK

National clinical guidance and policy for England, in the form of the Cardiovascular Disease Outcome Strategy, was published in March 2013 (CVD_OS 2013), for Scotland (SIGN 2002), for Northern Ireland (CREST 2006) and Wales (All Wales Cardiac Rehabilitation Working Group 2010). All emphasise the need for greater uptake of CR services. However, percentage uptake is difficult to capture accurately as the denominator of the calculation requires a count of the number of eligible patients. This process is time consuming and expensive as it requires access to Hospital Episodes Statistics (HES) data using diagnostic, treatment and operational codes. In the NACR annual report CR uptake is calculated for MI, PCI and CABG patients only and is based on data from 60,140 patients (Table 3). This represents the majority of the CR activity but does not equate to total patient throughput which is much higher (77,590) due to CR programmes treating patients with heart failure, valve surgery, ICD and cardiac arrest (Table 1 and 2). It is not possible, at this stage, to collect appropriate HES data for these additional patient groups. The HSCIC and the NACR are working to find a solution to this problem by the time of the next report in 2015.

UK

Overall uptake to CR in the UK is 45% across CABG, elective PCI, MI and MI+PCI patient groups (Table 3). This represents an increase of two percentage points in uptake resulting in over 1,800 more patients attending CR in 2012-2013 compared to last year. The previous approach to reporting uptake combined MI with MI+PCI which at the time seemed logical, but given that MI+PCI is now the dominant intervention it makes sense to report this as a separate category. In addition this new approach allows for comparison of MI and primary PCI activity reported in the Myocardial Ischaemia National Audit Project and the National Audit of Percutaneous Coronary Interventional Procedures.

The NACR 2014 report, for the year 2012-2013, should now be viewed as the new baseline for CR which shows that uptake to CR ranges from 33% in post MI patients to 80% for patients following CABG surgery. What is clear from the new approach is that MI+PCI patients have a 20% higher overall uptake compared to post MI patients. The recruitment of post MI patients to CR now ranks lowest of the four categories meaning that over 37,000 patients didn't receive a NICE recommended CR intervention (NICE 2013). The number of patients with MI+PCI attending CR has finally moved above the 50% mark suggesting that CR programmes are aligning recruitment of patients to the smaller windows of opportunity available through modern cardiology procedures.

ENGLAND

Overall uptake to CR in England was 46% with around 1,825 more patients receiving CR across all four condition areas (Table 3). Uptake to CR in patients following CABG surgery is 82% which is a value that leads the world, whereas uptake to CR for post MI patients is poor in comparison, at only 35%. The number of patients with MI+PCI attending CR has reached 50% but more is needed to ensure that the figures for elective PCI patients mirror that of primary PCI.

NORTHERN IRELAND

Uptake to CR in Northern Ireland is 32% across all condition groups with elective PCI lowest at 16% and CABG recruitment at 58%. There is one positive uptake value in that the percentage of post MI and MI+PCI patients is above the national average across all three nations. There is however a caveat to this value as it includes MI+PCI which we were unable to separate due to coding issues. This category will be reported as per the procedure of the other nations in next year's report.

WALES

CR uptake in Wales is 38% ranging from 22% for post MI to a highly successful 79% for MI+PCI. The procedures for recruiting patients following MI+PCI are obviously working well and should be applied to post MI and elective PCI patients to overcome the much lower uptake to CR from these groups.

Table 3
CR uptake split by country and diagnosis/treatment groups

	N	Receiving CR	%
UK: combined data for all three nations			
MI	56010	18689	33
MI+PCI	36174	19129	53
PCI (Elective)	28924	11595	40
CABG	13417	10727	80
Total	134525	60140	45
England			
MI	49657	17443	35
MI+PCI	34385	17248	50
PCI (Elective)	25070	10795	43
CABG	12126	9907	82
Total	121238	55393	46
Northern Ireland*			
MI and MI+PCI	2426	1056	44
PCI (Elective)	2522	401	16
CABG	566	329	58
Total	5514	1786	32
Wales			
MI	4281	932	22
MI+PCI	1435	1139	79
PCI (Elective)	1332	399	30
CABG	725	491	68
Total	7773	2961	38

* Figures for Northern Ireland for MI with PCI and MI alone could not be separated so are presented together

Part three

NEW NACR REGIONAL REPORTING AREAS ACROSS THE UK

NEW NACR REGIONAL REPORTING AREAS ACROSS THE UK

In order to align the NACR with NHS policy and the emerging accountability framework the national audit has chosen to report key performance indicators and patient outcomes at a regional level. This is the first of a three staged approach starting with regional reporting in November 2014, followed by Clinical Commissioning Group reporting (web-based) in 2015 and finally CR programme level reporting by autumn 2016. Table 4 shows the 19 regions, across the three nations represented in the NACR, used in reporting this year's audit figures. The NACR 2014 report, which uses data from 2012-2013, acts as a new baseline for CR services in the UK and will become the comparator year for future reports.

Table 4
NACR regional reporting areas for the UK

Country	Health regions	NACR regional abbreviations
England	Cheshire and Merseyside	C & M
	East Midlands	EM
	East of England	E o E
	Greater Manchester, Lancashire and South Cumbria	G M, L & S C
	London	L
	Northern England	NE
	South East Coast	SEC
	South West	SW
	Thames Valley	TV
	Wessex	W
	West Midlands	WM
	Yorkshire and The Humber	Y & TH
Northern Ireland	Belfast Health and Social Care Trust	BH & SCT
	Northern Health and Social Care Trust	NH & SCT
	South East Health and Social Care Trust	SEH & SCT
	Southern Health and Social Care Trust	SH & SCT
	Western Health and Social Care Trust	WH & SCT
Wales	North Wales Cardiac Network	NWCN
	South Wales Cardiac Network	SWCN

CR programme data by country and region

CR PROGRAMME DATA BY COUNTRY AND REGION

Following the recent implementation of specific clinical regions across the UK the NACR is reporting to these 19 regions for the first time and by doing so is creating a new baseline for CR in the UK. Table 5 shows that all networks and health boards are represented with some having a minimum of programmes submitting data to the national audit (e.g. Northern England with 13%) whereas the average representation across the other 18 health regions is over 70%. Wessex and all five Northern Ireland regions have 100% representation with all programmes submitting to the NACR. Wales is also strongly represented with 75% from their two cardiac networks.

Table 5
CR programme data by country and region

Country	Health regions	Total programmes	Electronic NACR data	% Entering data	Initiating event records
England	C & M	14	8	57	5010
	EM	21	12	57	7408
	E o E	30	16	53	7262
	G M, L & S C	24	18	75	11359
	L	40	24	60	11593
	NE*	24	3	13	592
	SEC	21	14	67	7063
	SW	28	14	50	9093
	TV	7	5	71	2927
	W	9	9	100	4195
	WM	29	15	52	6251
	Y & TH	32	11	34	5147
Northern Ireland	BH & SCT	3	3	100	1441
	NH & SCT	4	4	100	1109
	SEH & SCT	3	3	100	1080
	SH & SCT	3	3	100	822
	WH & SCT	2	2	100	850
Wales	NWCN	5	4	80	1955
	SWCN	19	14	74	5372
Other		3	1	33	107
Total		321	183	57	90636

Only three programmes, in this region, submit data to the NACR.

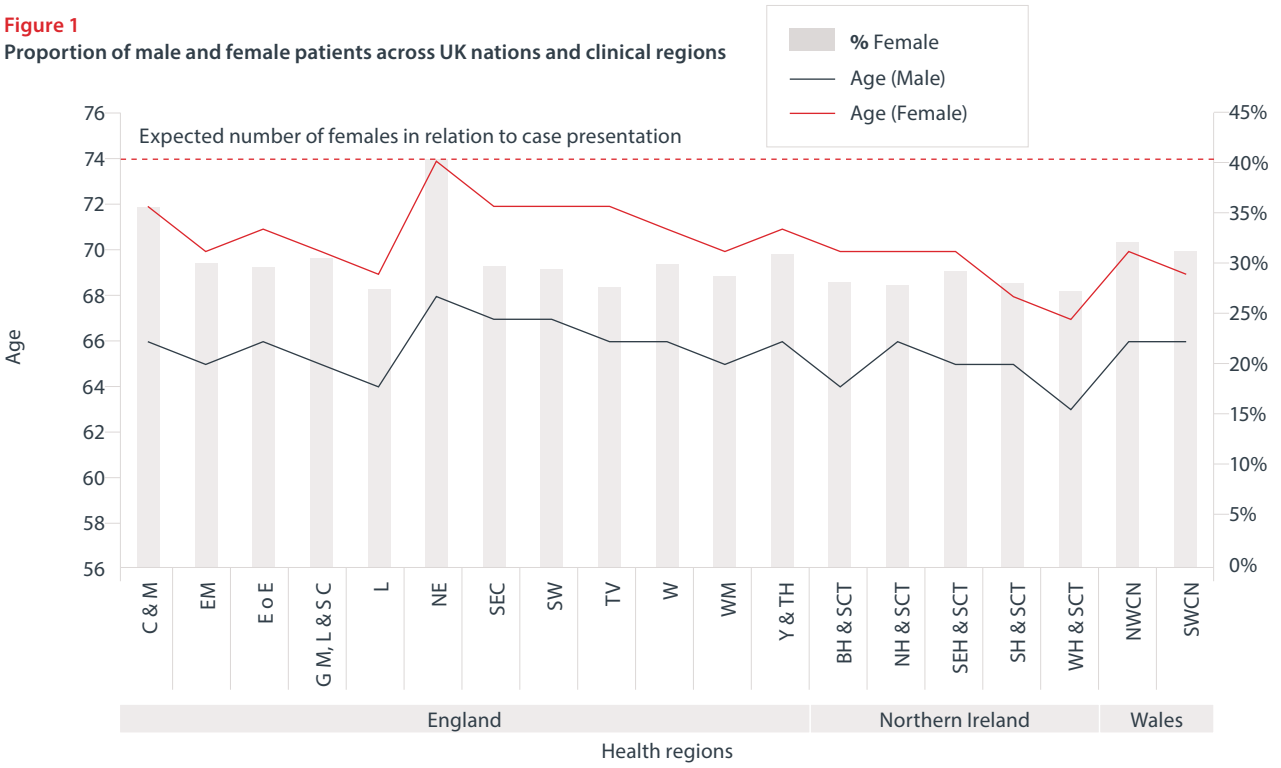
AGE AND GENDER CR PROFILE

Older age and female gender are known to impact on uptake to CR and the extent of outcomes achieved, which is why the national audit collects this particular data. If uptake to CR is related to case presentation across cardiology there should be approximately 40% of patients from female gender. All health regions, across the UK, fail to meet the expected proportion of female gender attending CR (Table 6 and Figure 1). The stated values for eligibility and attendance from Northern England SCN are based on less than 600 patients and are therefore unrepresentative of that region and not comparable with the other 19 regions in the UK. For all 19 regions in the UK females recruited to CR were, on average, significantly older than males attending CR in the same region. This is a larger difference than that seen in general cardiology where younger females, below the age of 65, regularly undergo cardiac reperfusion following myocardial infarction (MI). The proportion of females accessing CR across UK health regions was 28 to 36%, suggesting that all regions could do more to improve their CR offer and aim to attract a greater number of female patients.

Table 6
NACR demographics for age and gender across UK nations and clinical regions

			Male		Female		Age	
Country	Health regions	N	Age	%	Age	%	Minimum	Maximum
England	C & M	4858	66	64	72	36	20	103
	EM	7365	65	70	70	30	19	100
	E o E	7179	66	70	71	30	19	101
	G M, L & S C	11024	65	69	70	31	17	103
	L	11498	64	72	69	28	17	101
	NE	590	68	59	74	41	22	102
	SEC	7054	67	70	72	30	17	106
	SW	8611	67	70	72	30	17	103
	TV	2817	66	72	72	28	18	103
	W	4194	66	70	71	30	19	98
	WM	6002	65	71	70	29	18	102
	Y & TH	4637	66	69	71	31	17	103
Northern Ireland	BH & SCT	1381	64	72	70	28	19	102
	NH & SCT	1107	66	72	70	28	20	99
	SHE & SCT	1077	65	71	70	30	28	99
	SH & SCT	780	65	72	68	28	17	99
	WH & SCT	850	63	73	67	28	17	99
Wales	NWCN	1950	66	68	70	32	18	99
	SWCN	5249	66	69	69	32	17	99
Other		105	61	63	60	37	30	87
Total		88328	66	70	70	30	17	106

Figure 1
Proportion of male and female patients across UK nations and clinical regions



ETHNICITY, EMPLOYMENT AND MARITAL STATUS

The demographic profile of CR in the UK is predominately British male (Table 7), married (69%) and retired (58%) as per Table 8. The CR gender profile is lower than the demographic profile for routine cardiology procedures particularly for female Asian patients. The lower numbers of employed and unemployed patients attending CR highlights a limitation in the provision of CR that differs substantially from that seen in cardiology. The number of day-case PCI procedures has increased to >25% in 2013 creating a limited window of opportunity to recruit patients, which is likely to impact substantially on the ability to recruit patients generally - most notably patients who are employed full time.

Table 7
Ethnicity by gender

Ethnicity	%	Male %	Female %
British	80	70	31
Irish	2	71	29
Any other White background	4	72	28
White and Black Caribbean	<1	62	38
White and Black African	<1	70	30
White and Asian	<1	73	27
Any other mixed background	<1	78	22
Indian	2	76	24
Pakistani	2	77	23
Bangladeshi	<1	82	19
Any other Asian background	1	79	21
Caribbean	<1	63	38
African	<	61	39
Any other Black background	<	71	29
Chinese	<1	74	26
Any other ethnic group	1	76	24
Not Stated	8	70	30
Total	100	70	30

N=68641

Table 8
Marital status and employment

Marital Status	%
Single	9
Married	69
Permanent partnership	4
Divorced	5
Widowed	12
Separated	1

N=73381

Employment status	%
Employed Full time	17
Employed Part time	4
Self-employed full time	5
Self-employed part time	2
Unemployed - looking for work	2
Government training scheme	<1
Looking after family/home	2
Retired	58
Permanently sick/disabled	4
Temporarily sick or injured	8
Student	<1
Other reasons not working	<1

N=30351

CO-MORBIDITY AND REASONS FOR NOT TAKING PART OR NOT COMPLETING CR

More patients than ever are attending CR with two or more co-morbidities across a range of different conditions (Table 9) which is known to impact on compliance to CR programme length and outcome. Based on NACR data an increasing number of co-morbidities, of three or more, is associated with reduced outcomes following CR compared to patients with less co-morbidity. The combination of multiple risk factors and high levels of co-morbidity is best managed by a multi-disciplinary team approach which is not available in all CR programmes (Table 16). The BACPR minimum standards and CR Certification Programme reaffirm the need for a multi-disciplinary approach made up of competent staff from a range of professional groups.

Table 9
Co-morbidity profile for CR

Co-morbidity	%
Angina	26
Arthritis	16
Cancer	8
Diabetes	23
Rheumatism	3
Stroke	7
Osteoporosis	3
Hypertension	49
Chronic bronchitis	2
Emphysema	2
Asthma	10
Claudication	4
Chronic pain/Back problem	10
Other illnesses	31

N=50801

Table 10 shows that the three main reasons for not taking part in acute hospital CR are 'not referred to rehab', 'rehab not needed' or 'staff not available to manage the referral'. National guidance recommends referral of all eligible patients to CR and that suitability for CR should be based on an assessment by the CR team and the wishes of the patient. Table 10 shows that only 2% of 605 patients refused or were not interested yet 48% of the 605, who responded, were judged by the acute provider as not suited to CR. Referral to CR has just been approved as part of the NHS Commissioning Board's Clinical Commissioning Group Outcomes Indicator Set (CCG OIS) which will take effect from 2016 and will be monitored by CCGs in England. Most CR programmes try to achieve best practice as part of their professional role which should continue to be the main motive. However, substandard care cannot be condoned and is one of the reasons referral patterns for eligible patients to CR are being monitored, through clinical indicators, by NHS England.

The main reason reported for not taking part in the core delivery of CR remains as 'a lack of interest or refusal'. Approximately 39% (765) patients, from 1963 audit responses to this item, gave this as their main reason for not wanting to take up CR (Table 10). This statistic may only represent 765 patients, or <1% of the total number of patients in this year's audit, nevertheless it suggests that CR programmes could do more to improve the attractiveness of the CR offer to some patients.

Table 10
Reason for not taking part in CR

Reason For Not Taking Part	Acute Hospital %	Intermediate (Phase II) %	Core delivery %	Long term maintenance %
Patient not interested/refused	2	27	39	37
Ongoing investigation	1	3	7	5
Physical incapacity	0	3	9	6
Returned to work	0	0	3	4
Local exclusion criteria	2	5	1	0
No transport	0	0	1	1
Died	2	4	2	0
Not referred	19	6	1	12
Too ill	1	3	4	1
Rehab not needed	20	2	2	2
Rehab not appropriate	3	7	5	17
Staff Not available	9	1	0	0
Rapid transfer to tertiary centre	1	0	0	0
DNA/no contact	1	20	12	4
Transfer to another programme	0	2	1	0
No service available	1	2	0	1
Transfer for PCI/intervention	2	0	0	0
Other	27	10	10	3
Unknown	8	4	2	8
	N=605	N=47	N=1963	N=512

Around 4,000 patients that started CR failed to complete the programme. This represents a significant challenge for CR services as it not only wastes valuable resources but it also fails to meet the needs of patients that had believed, in the first instance, that attendance at CR would benefit them. Completion of CR is a more established part of the Commissioning Board's CCG OIS which will be reported by CCGs in England from April 2015. In part, CR completion is defined as having completed Assessment 2 (post CR) which is known to be poorly administered by many CR programmes with fewer than 25% of programmes carrying out post CR assessments (Table 13 & Figure 3).

Table 11
Reason for not completing CR

Reason For Not Completing	Acute Hospital %	Intermediate (Phase II) %	Core delivery %	Long term maintenance %
DNA unknown reason	2	24	40	45
Returned to work	0	2	8	5
Left this area	1	1	1	1
Achieved aims	1	12	10	13
Planned/emergency intervention	62	5	2	1
Too ill	3	7	12	11
Died	20	8	1	0
Other	10	38	21	22
Hospital Re-Admission	0	1	1	1
Unknown	1	5	5	1
	N=922	N=1167	N=4604	N=95

Part four

ANALYSIS BASED ON NATIONAL MINIMUM STANDARDS

ANALYSIS BASED ON NATIONAL MINIMUM STANDARDS

The BACPR (2012) and NICE service guidance (CMG 39 & 40) recommend that CR programmes should be offered early and underpinned by assessment prior to, and on completion of, CR. The duration and frequency of CR, based on NICE guidance (NICE CG 172, 2013) and Cochrane Review (Heran et al 2011) should ideally be 12 weeks (or no less than 8 weeks) at a frequency of twice per week. The CR team should be multi-disciplinary with professionals that possess the skills and competences to support patients in achieving the desired health behaviour change and enabling these same skills, in patients and their carers, as part of a long term self-management approach (BACPR 2012).

IS CR DELIVERED EARLY ENOUGH TO MEET NATIONAL GUIDANCE?

There is clear guidance, from NICE, the Department of Health and the BACPR that CR should start within 28 days of referral for most patients following post MI medical management and PCI. The timeframe for patients undergoing CABG is six weeks or 42 days. Table 12 and Figure 2 show that, for the vast majority of health regions, patients are waiting too long before starting CR. There are some regions such as Yorkshire and the Humber (Y & TH), West Midlands (WM) and the Southern Health and Social Care Trust (SH & SCT) in Northern Ireland, meeting guidance informed timeframes for post MI and PCI patients.

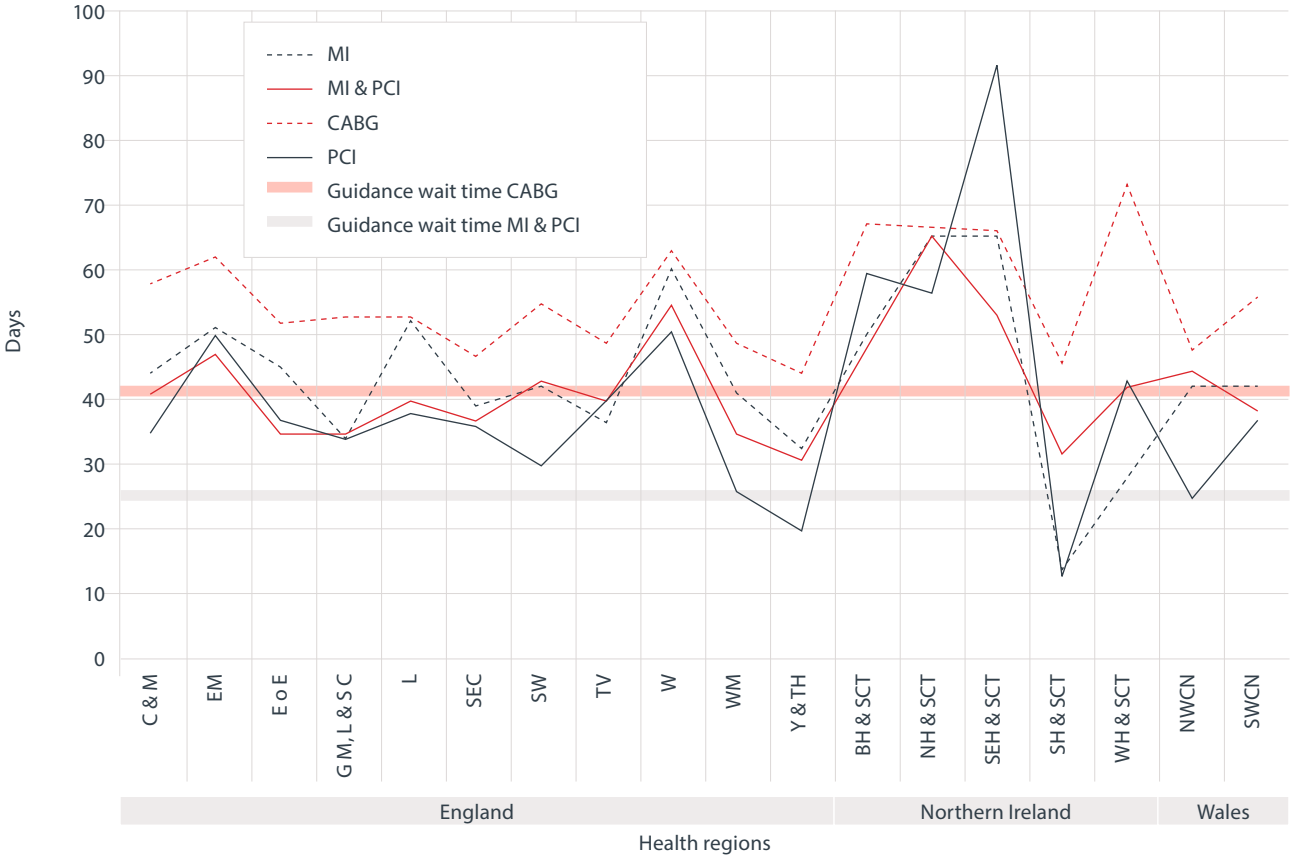
Table 12
Median wait time from referral to start of CR (days)

Country	Health regions	MI	MI & PCI	PCI	CABG	Heart Failure	Angina	Valve Surgery	Other
England N=27897	C & M	44	41	35	58	56	47	55	56
	EM	51	47	50	62	42	75	70	53
	E o E	45	35	37	52	49	43	53	40
	G M, L & S C	34	35	34	53	39	45	53	48
	L	52	40	38	53	38	47	49	42
	NE	n/c	n/c	n/c	n/c	n/c	n/c	n/c	n/c
	SEC	39	37	36	47	36	49	42	41
	SW	42	43	30	55	28	49	55	47
	TV	37	40	40	49	41	24	45	31
	W	60	55	51	63	44	29	55	62
	WM	41	35	26	49	27	51	48	37
	Y & TH	33	31	20	45	29	14	38	25
Northern Ireland N=1783	BH & SCT	50	48	60	67	n/c	96	61	59
	NH & SCT	65	65	57	67	n/c	26	76	64
	SEH & SCT	65	53	92	66	n/c	31	67	84
	SH & SCT	14	32	13	46	n/c	11	54	14
	WH & SCT	28	42	43	73	n/c	84	49	40
Wales N=2901	NWCN	42	45	25	48	29	70	56	42
	SWCN	42	39	37	56	31	52	48	42
Other		n/c	n/c	n/c	n/c	n/c	n/c	n/c	n/c
Total		43	40	36	54	37	48	50	43

n/c: not calculated due to small numbers. England N=27897, Northern Ireland N=1783, Wales N = 2901, Total N=32686

There is no health region in the UK presently meeting the guidance time of 42 days for bypass (CABG) patients. Some programmes in these regions are meeting the guidelines but they are not evident in the analysis due to poorer performance times by other programmes in the same region. There is an obvious need for most CR programmes to redesign their service to enable early commencement of CR. The BHF 'Innovative Service Redesign' scheme is one example of an approach that has helped cardiac services make the necessary changes to improve care for patients. As stated previously, the NACR considers 2014 to be the new baseline for CR in the UK and will look to monitor change in 'time to starting CR' in future reports.

Figure 2
Time from referral to start of CR



DO CR PROGRAMMES CARRY OUT PRE AND POST ASSESSMENT IN ACCORDANCE WITH NATIONAL GUIDANCE?

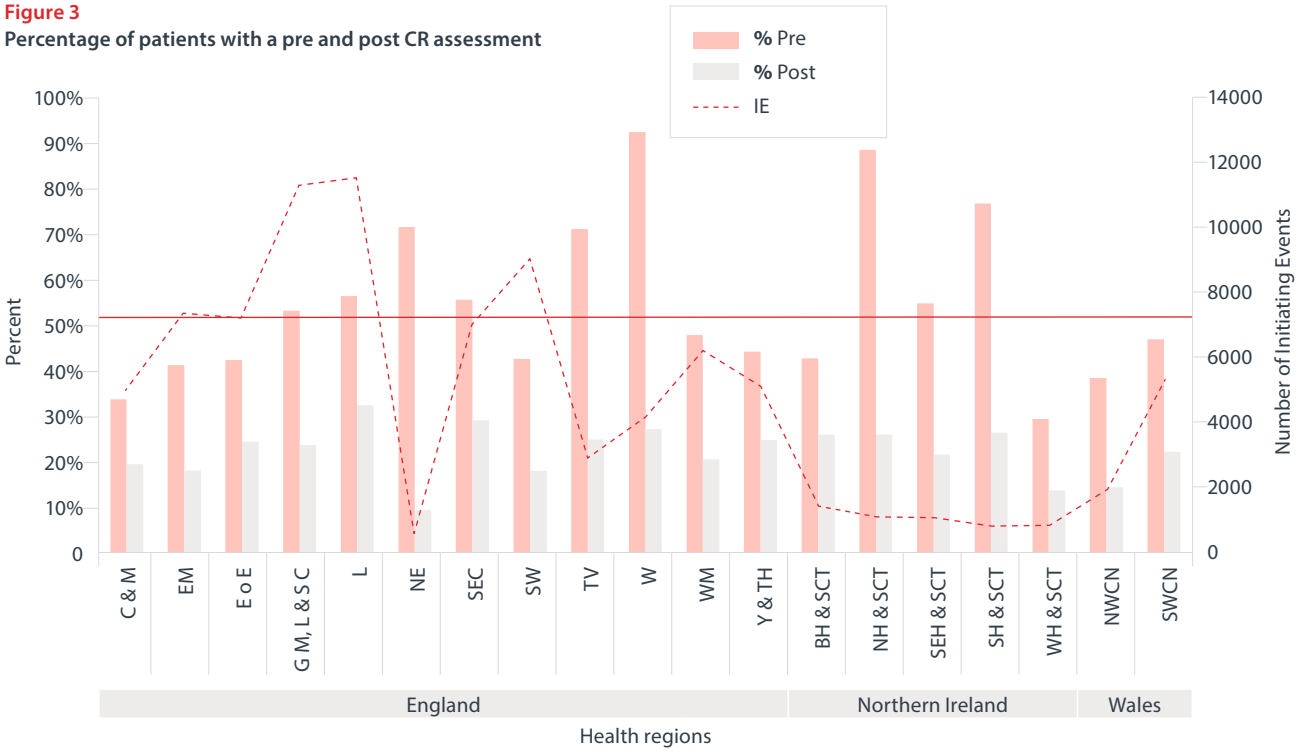
The BACPR Minimum Standards (BACPR 2012) and Department of Health CR Commissioning Pack (2010) stipulate that all patients should undergo a pre and post CR assessment with assessment 1 (pre CR) used to inform a tailored intervention and assessment 2 (post CR) used to evaluate the impact of the intervention and inform a long-term maintenance plan.

The proportion of CR patients, as a percentage of the number of referred patients, undergoing pre and post CR assessment is 51% and 24% respectively (Table 13 and Figure 3). If we use data from regions with 2 or more programmes per region, the percentage range across the 19 health regions, in the UK, is 30% to 93% for assessment 1 (pre CR). The situation for assessment 2 (post CR) is even more challenging with a range of 10% to 33%. This highlights excessive variation for pre CR assessment and a worryingly low priority for post CR assessment. The BACPR and the NACR is about to embark on a national certification programme which, if applied regionally on this year's data, would lead to many programmes not achieving the required minimum standard for assessment.

Table 13
Percentage of patients with pre and post assessments by country and region

Country	Health regions	Initiating event records	% Assessment 1 (Pre CR)	% Assessment 2 (Post CR)
England	C & M	5010	34	20
	EM	7408	42	18
	E o E	7262	43	25
	G M, L & S C	11359	54	24
	L	11593	57	33
	NE	592	72	10
	SEC	7063	56	29
	SW	9093	43	18
	TV	2927	72	25
	W	4195	93	27
	WM	6251	48	21
	Y & TH	5147	44	25
Northern Ireland	BH & SCT	1441	43	26
	NH & SCT	1109	89	26
	SEH & SCT	1080	55	22
	SH & SCT	822	77	27
	WH & SCT	850	30	14
Wales	NWCN	1955	39	15
	SWCN	5372	47	22
Other		107	100	97
Total		90636	51%	24%

Figure 3
Percentage of patients with a pre and post CR assessment



IS THE TIMING OF BASELINE ASSESSMENT (PRE CR) ALIGNED WITH NATIONAL GUIDANCE?

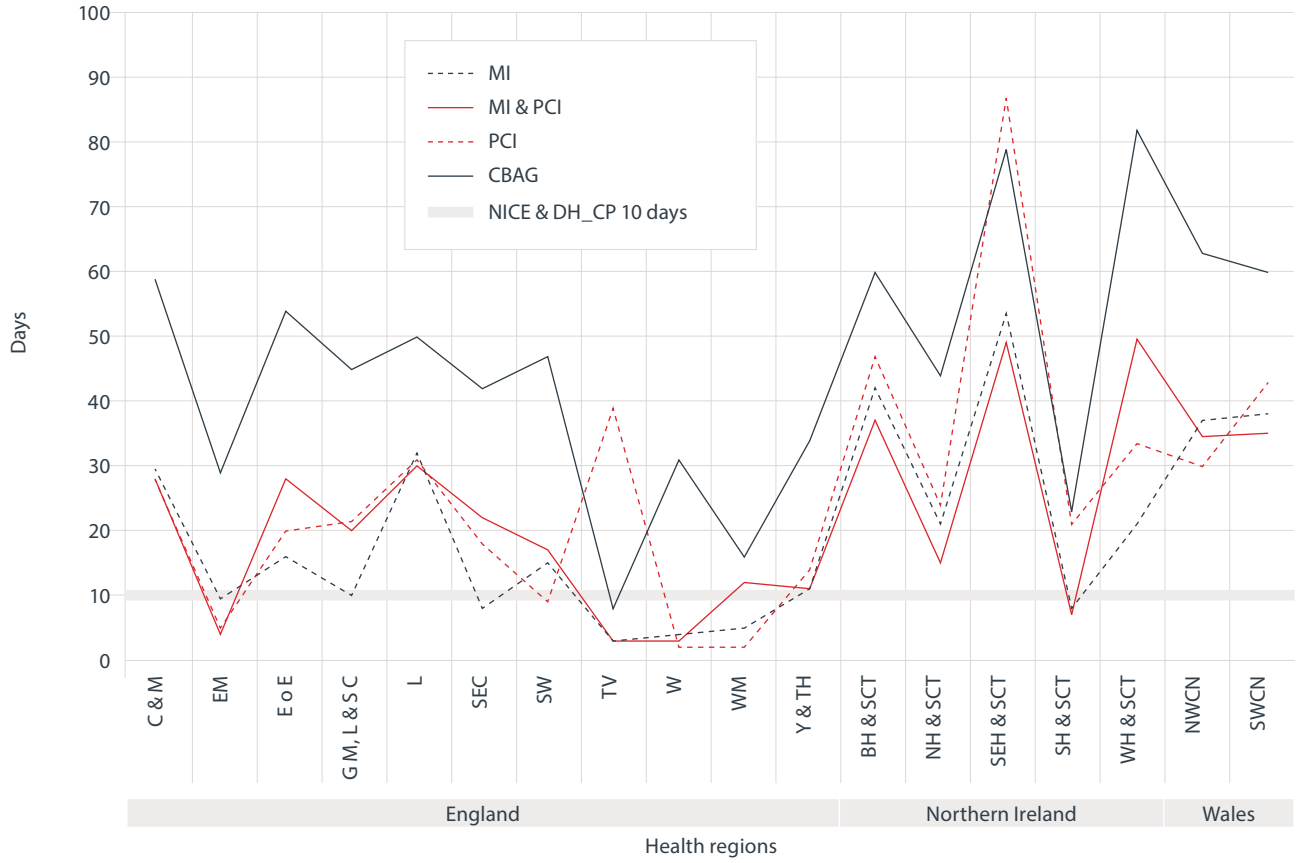
National guidance recommends that CR assessment should start within 10 days of referral. NACR data shows that this is being achieved by most SCNs in England and the Southern Health and Social Care Trust in Northern Ireland (Table 14 and Figure 4). The other Trusts in Wales and cardiac networks in Northern Ireland are doing less well in promoting early assessment. A positive outcome is that the overall median wait time for patients following MI is 9 days however within this statistic is a large amount of variation. What this shows is that some programmes have, through redesigning their services, been able to meet national guidance timeframes.

Table 14
Median wait time from initiating event to pre CR assessment (days)

Country	Health regions	MI	MI & PCI	PCI	CABG	Heart Failure*
England	C & M	30	28	28	59	44
	EM	10	4	5	29	22
	E o E	16	28	20	54	49
	G M, L & S C	10	20	22	45	31
	L	32	30	31	50	46
	NE	n/c	n/c	n/c	n/c	n/c
	SEC	8	22	18	42	48
	SW	15	17	9	47	26
	TV	3	3	39	8	42
	W	4	3	2	31	48
	WM	5	12	2	16	59
	Y & TH	11	11	14	34	34
Northern Ireland	BH & SCT	42	37	47	60	n/c
	NH & SCT	21	15	24	44	n/c
	SEH & SCT	54	49	87	79	n/c
	SH & SCT	8	7	21	23	n/c
	WH & SCT	21	50	34	82	n/c
Wales	NWCN	37	35	30	63	n/c
	SWCN	38	35	43	60	59
Total		15	20	20	46	41

N=38682

Figure 4
Median wait time from initiating event to assessment 1 (pre CR)



IS THE DURATION OF CR MEETING NATIONAL GUIDANCE?

The evidence base for CR, from NICE (CG 172) and Cochrane Reviews (Heran et al 2011), states that the duration of CR should be 12 weeks (or 84 days), with two sessions per week, and that an absolute minimum, which might bring about the desired effect, is eight weeks (or 56 days). Table 15 and Figure 5 show that the median duration of CR for nine of the SCNs in England is below the basic minimum (56 days) and well below the evidence-based preferable duration of 84 days or 12 weeks.

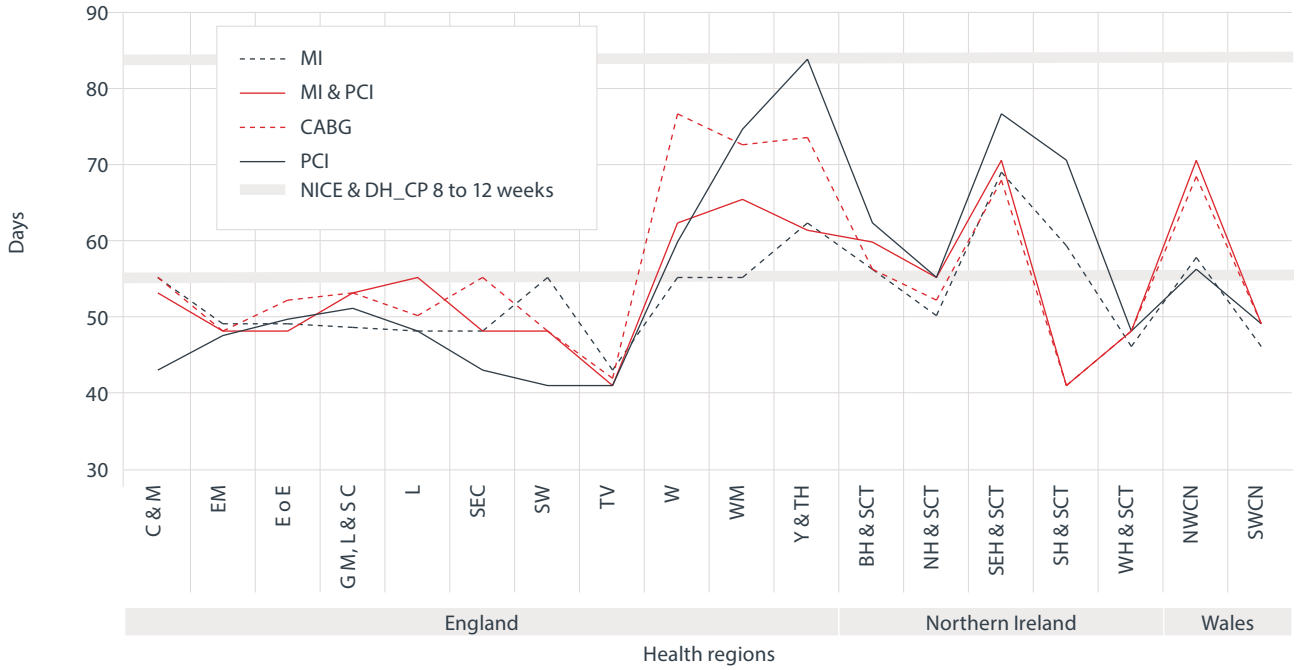
Wessex, West Midlands, Yorkshire and the Humber plus two of the Trusts in Northern Ireland (BH & SCT, SEH & SCT) and one in Wales (NWCN) delivered CR at the required duration in 2012-2013. This proves that an evidence-based CR duration is achievable within an NHS service provision. The ability of CR programmes to facilitate sustained health behaviour change requires that healthcare interventions occur regularly over months and not just a few weeks. There is an urgent need for CR services, not meeting the minimum duration, to redesign their services to align with national clinical guidance.

Table 15
Median length of CR (days)

Country	Health regions	MI	MI & PCI	PCI	CABG	Heart Failure	Angina	Valve Surgery	Other
England	C & M	56	54	44	56	63	57	49	56
	EM	50	49	49	49	47	42	52	42
	E o E	50	49	51	53	70	65	49	49
	G M, L & S C	50	54	52	54	70	56	56	53
	L	49	56	49	51	56	49	50	50
	NE	n/c	n/c	n/c	n/c	n/c	n/c	n/c	n/c
	SEC	49	49	44	56	63	62	49	56
	SW	56	49	42	49	131	63	67	58
	TV	44	42	42	43	42	38	44	47
	W	56	63	61	77	n/c	81	77	56
	WM	56	66	75	73	88	70	72	76
	Y & TH	63	62	84	74	n/c	102	75	98
Northern Ireland	BH & SCT	n/c	61	63	57	n/c	n/c	n/c	n/c
	NH & SCT	51	56	56	53	n/c	n/c	n/c	n/c
	SEH & SCT	70	71	77	69	n/c	n/c	n/c	n/c
	SH & SCT	n/c	42	71	42	n/c	n/c	n/c	n/c
	WH & SCT	47	49	49	49	n/c	n/c	n/c	n/c
Wales	NWCN	59	71	57	69	n/c	7	100	49.5
	SWCN	47	50	50	50	66	61	47	54
Other		n/c	n/c	n/c	n/c	n/c	n/c	n/c	n/c
Overall median		52	54	51	56	63	55	56	56

England N=23549, Northern Ireland N=1563, Wales N=2380, Total N=27492

Figure 5
Duration of CR programmes



IS CR DELIVERED BY A MULTI-DISCIPLINARY TEAM AS RECOMMENDED BY NATIONAL GUIDANCE?

The evidence base for effective CR is underpinned by multi-disciplinary teams, working collectively to ensure that all the core components of CR are delivered by staff with the appropriate skills and expertise to help patients achieve the most from their programme. When the above rationale is combined with an increasing number of patients presenting with multiple risk factors and high levels of co-morbidity, the need for a multi-disciplinary team approach becomes even more of a priority. Table 16 shows that the national staffing profile has improved slightly on previous years but there remains one particular challenge in that only 10% of programmes have access to a psychologist. The two most noticeable positive changes in national staffing profile were a seven percentage point increase in the number of physiotherapists and an increase in admin/secretarial support which collectively means that 63% of programmes have access to staff skilled in data entry.

A more detailed breakdown of CR staffing, by programme, is available on the NACR webpage.

http://www.cardiacrehabilitation.org.uk/docs/NACR%202014%20Report%20on%20staffing.pdf

Table 16
Staffing profile for CR programmes across the UK

Category	England N=222		Northern Ireland N=13		Wales N=22		Other N=3	UK total N=260	
	N	%	N	%	N	%	N	N	%
Nurse	203	91	13	100	22	100	3	241	93
Physiotherapist	151	68	10	77	18	82	2	181	70
Dietician	117	53	7	54	11	50	1	136	52
Psychologist	23	10	0	0	2	9	0	25	10
Social Worker	0	0	0	0	0	0	0	0	0
Counsellor	4	2	0	0	0	0	0	4	2
Doctor	17	8	1	8	0	0	0	18	7
Health Care Assistant	29	13	2	15	1	5	0	32	12
Secretary	141	64	5	38	15	68	0	161	62
Administrator	26	12	0	0	0	0	0	26	10
Exercise Specialist	111	50	0	0	5	23	0	116	45
Occupational Therapist	53	24	3	23	11	50	1	68	26
Pharmacist	97	44	7	54	11	50	1	116	45
Physiotherapy Assistant	62	28	1	8	4	18	1	68	26

Part five

EVALUATION OF CLINICAL OUTCOMES FOLLOWING CR BY COUNTRY AND CLINICAL REGION

ANALYSIS OF CR CONTRIBUTION TO SMOKING CESSATION

The contribution of CR to smoking cessation should be seen as a combined effort between CR programmes and smoking cessation services which often jointly support patients in trying to quit smoking. The good news is that many of the patients starting CR don't smoke and of those that do around 6% (range 3% to 12%) joined the ranks of the non-smoker by the time they finished CR. The ability to support patients in quitting smoking varies slightly across the 19 health regions but overall most CR programmes are having a positive impact.

Table 17
Percentage of non-smokers

Country	Health regions	Pre %	Post %	% Point Change
England	C & M	92	96	4
	EM	85	88	3
	E o E	90	95	5
	G M, L & S C	87	94	7
	L	90	95	5
	NE	n/c	n/c	n/c
	SEC	93	97	4
	SW	86	93	7
	TV	83	92	9
	W	85	91	6
	WM	84	92	8
	Y & TH	83	94	11
Northern Ireland	BH & SCT	86	94	8
	NH & SCT	84	92	8
	SEH & SCT	91	95	4
	SH & SCT	84	96	12
	WH & SCT	92	96	4
Wales	NWCN	n/c	n/c	n/c
	SWCN	90	92	2
Other		82	90	8
Total		88	94	6

N=10131

Figure 6
Percentage of non-smokers at each assessment

ANALYSIS OF CR CONTRIBUTION TO EXERCISE PER WEEK

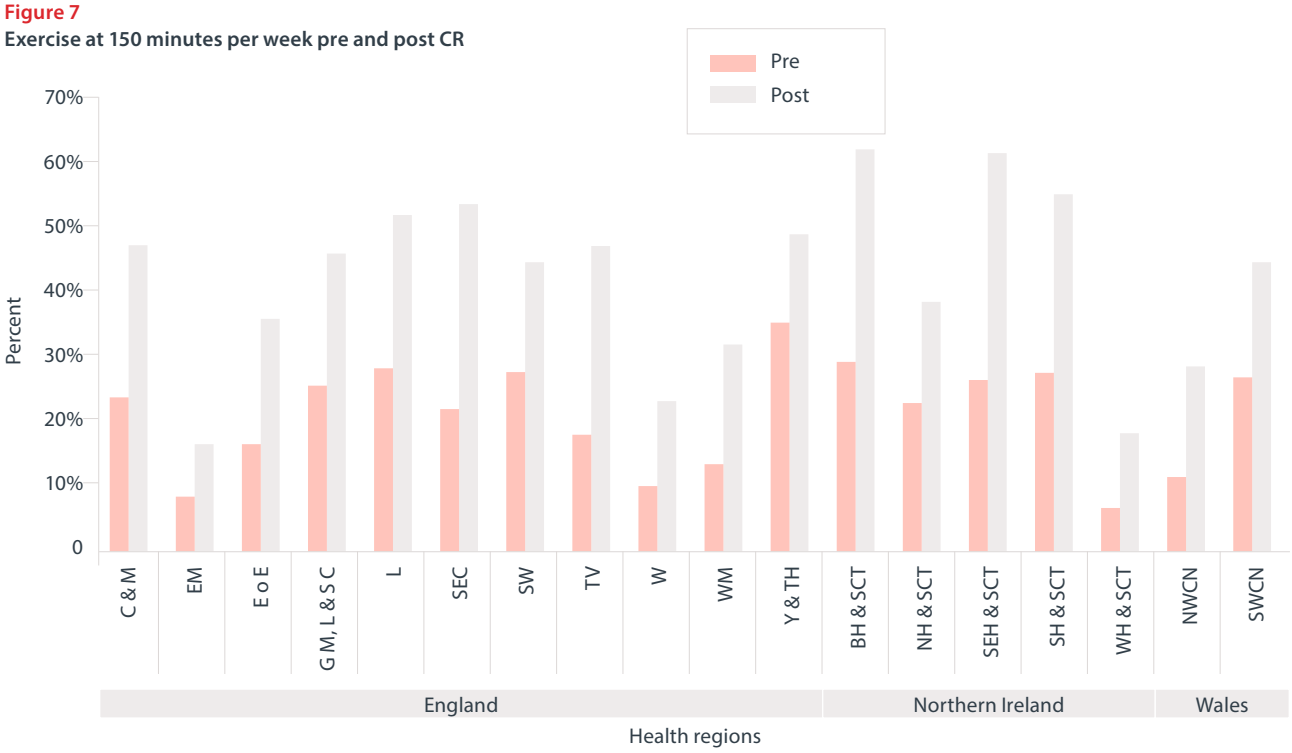
The ability to exercise and be physically active, at around 150 minutes a week, is a recommendation from the Chief Medical Officers (CMOs) across all nations in the UK, and a basic minimum standard for the BACPR (2012). The Health Survey of England highlights a trend toward being sedentary (HSCIC 2013) which is mirrored in the population that attend CR following a heart attack or after a cardiac procedure. The baseline exercise values (e.g. 150 minutes per week) for patients at pre CR assessment is overall 23%, with some regions showing even lower values, which creates an obvious challenge for CR programmes (Table 18 & Figure 7). It is reassuring to see that, for many health regions, significant improvement in exercise status occurs following CR. What is clear from the NACR data is that regions where exercise status is low achieved the least following CR. This data has two implications for how services offer exercise and physical activity as part of CR. Firstly, more emphasis and resources should be applied to services where the general profile is toward being sedentary and secondly there should be a general public health drive, from all programmes in all health regions across the UK, to increase the magnitude of change in exercise status following CR.

Table 18
Proportion of patients exercising 150 minutes per week pre and post CR

Country	Health regions	Pre %	Post %	% Point Change
England	C & M	24	48	24
	EM	9	17	8
	E o E	17	36	19
	G M, L & S C	26	46	20
	L	28	52	24
	NE	n/c	n/c	n/c
	SEC	22	54	32
	SW	28	45	17
	TV	18	47	29
	W	10	23	13
	WM	14	32	18
	Y & TH	36	49	13
Northern Ireland	BH & SCT	29	62	33
	NH & SCT	23	39	16
	SEH & SCT	27	62	35
	SH & SCT	28	55	27
	WH & SCT	7	18	11
Wales	NWCN	12	29	17
	SWCN	27	45	18
Other		67	93	26
Total		23	44	21

N=17236

Figure 7
Exercise at 150 minutes per week pre and post CR



ANALYSIS OF CR CONTRIBUTION TO BMI

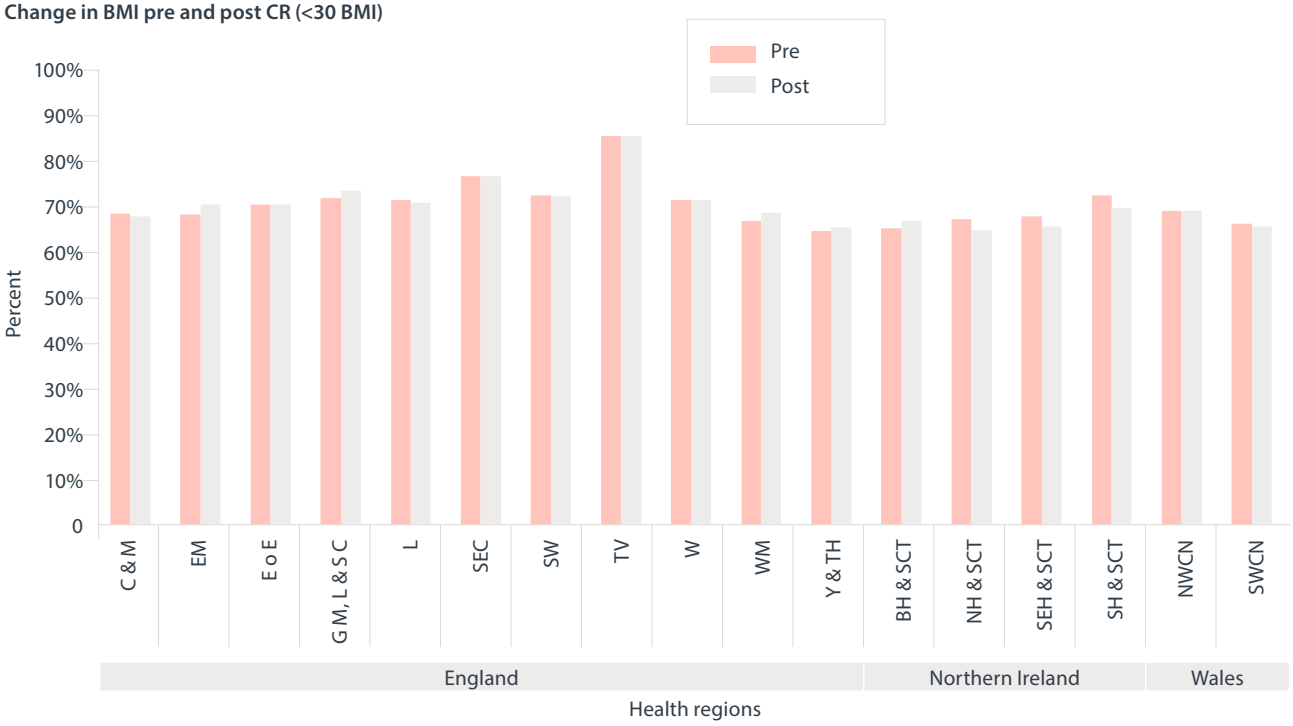
The importance of reducing body weight in patients with a high BMI is widely proclaimed as a top societal priority, and is particularly so for patients with established heart disease. At the same time clinical and research guidance tells of how difficult it is to achieve sustained weight reduction. What is clear from the wider evidence and guidance (NICE guidelines PH53) and from specific guidance (BACPR 2012) is that the approach taken should be longer term and involve patients, carers and a range of health professionals, including dieticians. What is clear from the NACR data (Table 19 & Figure 8) is that, in the context of those with a BMI <30, only slight positive change is seen across the 19 health regions following CR attendance. Worryingly in some health regions the proportion with a BMI <30 is slightly lower following CR meaning that some programmes appear to fail in helping patients change their lifestyle (including diet) sufficiently to reduce their weight and BMI. This is indeed disappointing but hardly surprising when the duration of CR is far below the evidence-based recommendations for interventions aiming to achieve sustained health behaviour change (BACPR 2012). Increasing the duration of CR programmes is part of the solution alongside a more detailed measurement of dietary habits and healthy eating, supported by staff with the relevant expertise.

Table 19
Percentage of patients with BMI <30 pre and post CR

Country	Health regions	Pre %	Post %	% Point Change
England	C & M	69	68	-1
	EM	69	71	2
	E o E	71	71	0
	G M, L & S C	72	74	2
	L	72	71	-1
	NE	n/c	n/c	n/c
	SEC	77	77	0
	SW	73	73	0
	TV	86	86	0
	W	72	72	0
	WM	67	69	2
	Y & TH	65	66	1
Northern Ireland	BH & SCT	66	67	1
	NH & SCT	68	65	-3
	SEH & SCT	68	66	-2
	SH & SCT	73	70	-3
	WH & SCT	n/c	n/c	n/c
Wales	NWCN	69	69	0
	SWCN	67	66	-1
Other		79	78	-1
Total		71	71	0

N=11301

Figure 8
Change in BMI pre and post CR (<30 BMI)



ANALYSIS OF CR CONTRIBUTION TO ANXIETY LEVELS

The ability of patients to manage the anxiety associated with a life threatening cardiac event remains at the forefront of acute cardiology and CR. It is reassuring to see (from Table 20a and Figure 9) that the ability of patients to manage anxiety improves across almost all nations and health regions following CR. This effect is seen in two ways (1) there are fewer patients with high levels of anxiety (e.g. Clinically Anxious) following CR and (2) many more patients in the borderline anxiety move to within the normal anxiety category following CR. Overall there was a 4 percentage point shift from patients in the clinically anxious group to the lower categories (-4) and a 2 percentage point shift (-2) to patients in the borderline anxiety category to the normal category (see Table 20b).

Table 20a
Percentage of patients by HADS anxiety categories pre and post CR

Country	Health regions	Pre			Post		
		Normal %	Borderline %	Clinically Anxious %	Normal %	Borderline %	Clinically Anxious %
England	C & M	73	17	10	77	16	7
	EM	70	17	12	76	15	8
	E o E	71	16	12	79	13	8
	G M, L & S C	71	16	13	78	15	8
	L	67	18	15	73	16	12
	NE	n/c	n/c	n/c	n/c	n/c	n/c
	SEC	74	15	11	79	13	8
	SW	71	18	11	78	15	7
	TV	73	15	13	80	12	8
	W	75	15	10	77	17	6
	WM	69	18	13	76	12	12
	Y & TH	71	16	13	77	13	11
Northern Ireland	BH & SCT	63	18	18	70	19	11
	NH & SCT	77	12	11	80	10	10
	SEH & SCT	70	18	12	80	13	7
	SH & SCT	70	17	13	78	11	12
	WH & SCT	n/c	n/c	n/c	n/c	n/c	n/c
Wales	NWCN	70	18	12	77	13	10
	SWCN	69	17	14	77	14	9
Other		67	15	18	77	12	11
Total		70	17	13	77	14	9

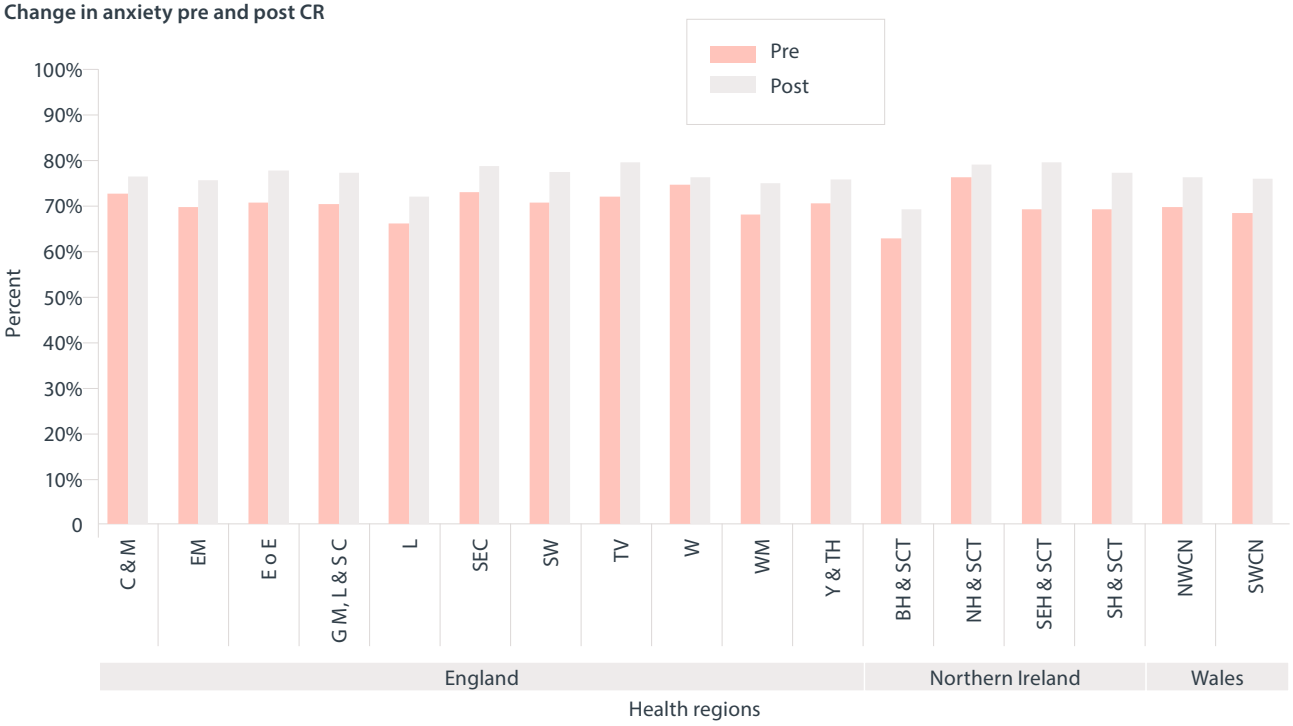
N=12225

Table 20b
Percentage point change in HADS anxiety following CR

Country	Health regions	N	Normal	% Point Change Borderline	Clinically anxious
England	C & M	570	4%	0%	-4%
	EM	548	6%	-2%	-4%
	E o E	1044	7%	-3%	-4%
	G M, L & S C	1749	7%	-2%	-5%
	L	2575	6%	-2%	-4%
	NE	45	0%	0%	0%
	SEC	1231	6%	-3%	-3%
	SW	875	7%	-3%	-4%
	TV	354	8%	-3%	-5%
	W	469	2%	2%	-4%
	WM	115	7%	-6%	-1%
	Y & TH	906	5%	-4%	-2%
Northern Ireland	BH & SCT	262	6%	1%	-7%
	NH & SCT	208	3%	-2%	-1%
	SEH & SCT	182	10%	-6%	-5%
	SH & SCT	86	8%	-7%	-1%
	WH & SCT	22	0%	0%	0%
Wales	NWCN	91	7%	-4%	-2%
	SWCN	815	8%	-3%	-5%
Other		100	10%	-3%	-7%
Total		12247	6%	-2%	-4%

NB: % point change may not add up due to rounding and totals may not add up to 100% due to rounding

Figure 9
Change in anxiety pre and post CR



ANALYSIS OF CR CONTRIBUTION TO LEVELS OF DEPRESSION

A known consequence of a life threatening cardiac event and cardiac surgery or procedures is that some patients will feel depressed, which is related to poorer outcomes following CR for some patients. Given the low numbers of health psychologists in CR programmes, there is a strategy from the BACPR to increase the skills of existing CR staff to meet the need of patients with high levels of anxiety and depression. Table 21a and Figure 10 show that the ability of patients to manage depressive symptoms improves following CR for almost all nations and health regions. This effect is seen in two ways (1) there are fewer patients with high levels of depression (e.g. Clinically Depressed) following CR and (2) more patients in the borderline depression move within the normal depression range following CR. Overall there was a 2 percentage point shift from patients in the clinically depressed group to the lower categories (-2) and a 2 percentage point shift (-2) from patients in the borderline depression category to the normal category (see Table 21b).

Table 21a
Percentage of patients by HADS depression categories pre and post CR

		Pre			Post		
Country	Health regions	Normal %	Borderline %	Clinically depressed %	Normal %	Borderline %	Clinically depressed %
England	C & M	83	11	6	88	9	3
	EM	84	10	6	84	10	6
	E o E	82	12	6	87	8	4
	G M, L & S C	81	12	7	87	9	4
	L	77	15	9	83	12	5
	NE	n/c	n/c	n/c	n/c	n/c	n/c
	SEC	83	11	6	87	9	4
	SW	86	10	4	89	8	3
	TV	84	11	6	88	8	5
	W	88	9	2	89	8	3
	WM	85	9	6	90	7	4
	Y & TH	84	9	6	85	9	6
Northern Ireland	BH & SCT	79	12	9	85	10	5
	NH & SCT	88	8	4	88	9	3
	SEH & SCT	86	9	4	92	4	4
	SH & SCT	78	13	9	83	10	7
	WH & SCT	n/c	n/c	n/c	n/c	n/c	n/c
Wales	NWCN	82	12	6	89	7	4
	SWCN	80	12	8	87	9	4
Other		82	12	6	90	6	4
Total		82	12	7	86	9	5

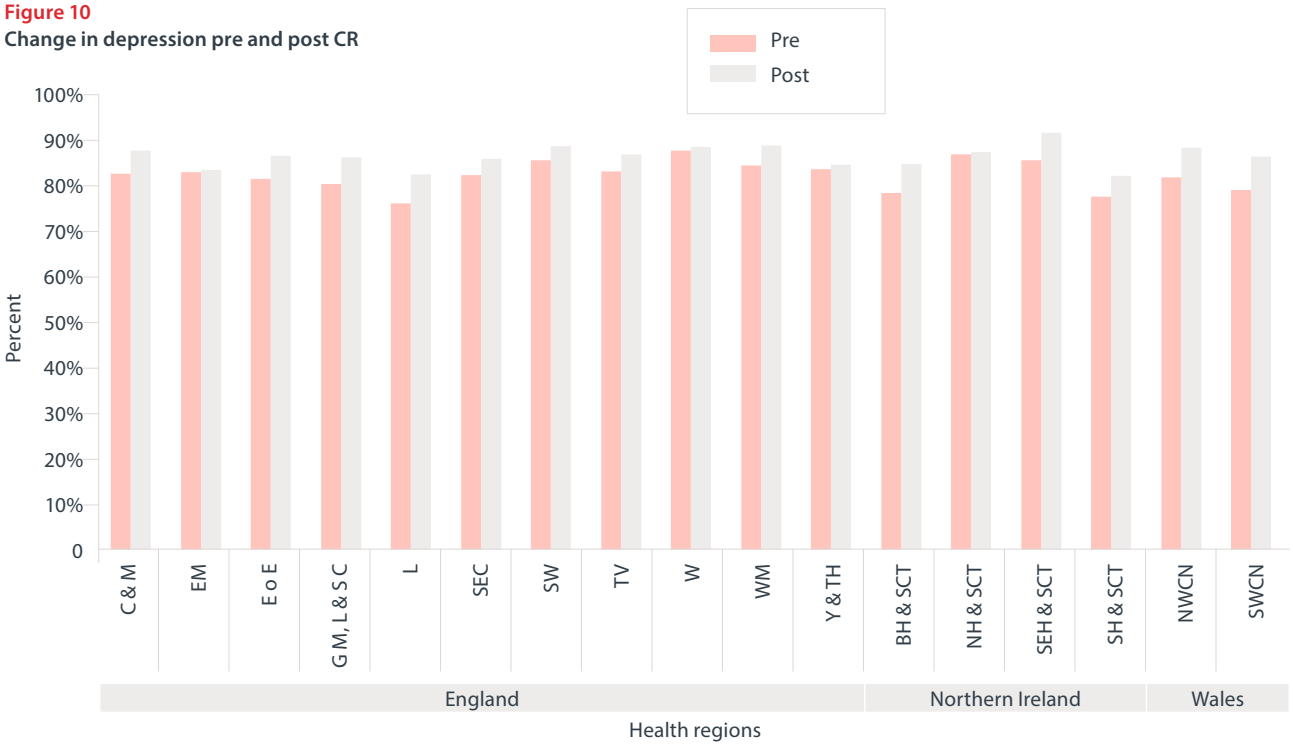
N=12225

Table 21b
Percentage point change in HADS depression following CR

Country	Health regions	N	Normal	% point change Borderline	Clinically Depressed
England	C & M	571	5%	-2%	-3%
	EM	548	1%	0%	0%
	E o E	1037	5%	-3%	-2%
	G M, L & S C	1746	6%	-3%	-3%
	L	2574	6%	-3%	-4%
	NE	45	0%	0%	0%
	SEC	1231	4%	-2%	-2%
	SW	872	3%	-3%	-1%
	TV	352	4%	-3%	-1%
	W	467	1%	-1%	0%
	WM	114	4%	-2%	-3%
	Y & TH	904	1%	-1%	0%
Northern Ireland	BH & SCT	261	6%	-2%	-4%
	NH & SCT	208	1%	0%	-1%
	SEH & SCT	181	6%	-6%	-1%
	SH & SCT	87	5%	-2%	-2%
	WH & SCT	22	0%	0%	0%
Wales	NWCN	91	7%	-6%	-1%
	SWCN	815	7%	-3%	-4%
Other		99	8%	-6%	-2%
Total		12225	5%	-2%	-2%

NB: % point change may not add up due to rounding and totals may not add up to 100% due to rounding

Figure 10
Change in depression pre and post CR



ANALYSIS OF CR CONTRIBUTION TO ADDITIONAL RISK FACTORS

Completion of CR is known to improve risk factor management, which is a finding supported by the 2014 CR report (Table 22). Evidence that CR and secondary prevention are working well can be seen in the case for lipid management where the proportion of patients with normal cholesterol improved by over 20 percentage points after attending CR. Smaller but nevertheless important changes occurred for waist circumference. Excessive alcohol intake is not characteristic of CR participants in the UK as fewer than 7% are above the normal drinking recommendations. The poor effect of CR in shifting the proportion of patients with high blood pressure into normal recommended values is less encouraging and highlights an area requiring greater emphasis from CR practitioners. Slightly more females (4 percentage points) than males (3 percentage points) improved in terms of waist circumference measurement. This is a hard to achieve target especially when most CR programmes are not being delivered over the required duration of around 12 weeks as stated by NICE (CG 172) and Cochrane Reviews (Heran et al 2011).

Table 22
Additional CR outcomes

		Pre %	Post %	% Point Change
Cholesterol N=4367 (Total)	Total <4.0	32	55	23
N=1979 (LDL)	LDL <2	32	53	21
Blood Pressure	Systolic <140 and diastolic <90	69	70	1
N=11830				
Waist	<102 men	63	66	3
N=4348 (Male)	<88 cm woman	37	41	4
N=1256 (Female)				
Alcohol	Alcohol (men ≤ 21 units/week) Women ≤14 units/week)	93	93	0
N=692				

ANALYSIS OF CR CONTRIBUTION TO NORMAL HEALTH RELATED QUALITY OF LIFE

The percentage of patients with normal health related quality of life, as measured using the Dartmouth COOP tool, changed positively by an average of around 15 percentage points with the exception of 'social support' which dropped slightly by three percentage points (Table 23). The perception of 'physical fitness' by patients is the poorest measure of the COOP items at baseline (pre CR) and shows considerable variation between countries and across the 19 clinical regions in the UK. The same item does however show large improvement, across all 19 regions, following CR.

Table 23
Percentage of patients with normal health related quality of life (Dartmouth COOP) score pre and post CR

		Physical fitness		Feelings		Daily Activities		Social Activities	
Country	Health regions	Pre %	Post %	Pre %	Post %	Pre %	Post %	Pre %	Post %
England	C & M	32	68	85	92	80	95	80	93
	EM	40	63	84	89	88	93	85	91
	E o E	44	71	85	90	86	95	85	93
	G M, L & S C	36	72	83	90	83	96	78	94
	L	40	70	81	88	83	94	79	92
	NE	n/c	n/c	n/c	n/c	n/c	n/c	n/c	n/c
	SEC	39	75	85	90	84	94	80	93
	SW	51	74	84	88	88	96	85	95
	TV	53	78	87	92	84	95	82	95
	W	54	75	84	90	89	97	86	95
	WM	32	73	87	92	83	96	74	96
	Y & TH	24	51	85	88	87	94	82	92
Northern Ireland	BH & SCT	41	71	84	87	88	95	86	93
	NH & SCT	56	68	92	91	93	98	95	93
	SEH & SCT	48	76	89	92	91	96	92	94
	SH & SCT	37	67	81	85	82	95	75	93
	WH & SCT	n/c	n/c	n/c	n/c	n/c	n/c	n/c	n/c
Wales	NWCN	48	83	87	92	84	100	81	95
	SWCN	43	67	84	87	85	94	82	93
Other		66	93	72	88	94	100	93	99
Total		40	70	84	89	85	95	81	93

N=10224

Table 23 (continued)
Percentage of patients with normal health related quality of life (Dartmouth COOP) score pre and post CR

Country	Health regions	Pain		Overall Health		Social Support		Quality of Life	
		Pre %	Post %	Pre %	Post %	Pre %	Post %	Pre %	Post %
England	C & M	77	83	64	80	90	85	96	99
	EM	78	79	59	71	86	82	97	98
	E o E	80	85	68	80	87	86	96	98
	G M, L & S C	75	83	61	79	89	87	94	97
	L	74	82	62	78	84	84	94	97
	NE	n/c	n/c	n/c	n/c	n/c	n/c	n/c	n/c
	SEC	76	84	67	77	88	85	95	96
	SW	78	83	66	79	88	85	93	97
	TV	80	91	65	84	91	86	94	99
	W	74	84	71	83	93	90	95	99
	WM	82	85	65	84	92	78	95	96
	Y & TH	78	79	68	73	89	84	94	96
Northern Ireland	BH & SCT	76	81	67	80	89	81	96	95
	NH & SCT	89	89	79	83	85	85	98	99
	SEH & SCT	78	84	78	87	91	84	98	98
	SH & SCT	81	83	70	84	94	92	96	94
	WH & SCT	n/c	n/c	n/c	n/c	n/c	n/c	n/c	n/c
Wales	NWCN	78	83	73	87	91	92	98	98
	SWCN	75	80	65	78	87	84	95	98
Other		71	77	71	84	95	90	88	97
Total		76	82	65	79	88	85	95	97

N=10224

Part six

RECOMMENDATIONS AND ACTIONS

RECOMMENDATIONS AND ACTIONS

The 2014 report marks a significant change in how the NACR intends to use data to help inform commissioning and support service improvement for the benefit of patients with cardiovascular disease attending CR in the UK.

Recommendations:

1. CR programmes are treating more patients than ever but more needs to be done to recruit and refer a greater percentage of patients from the eligible groups. This is particularly the case for medically managed post MI patients and elective PCI patients.
2. There is an urgent need for CR services not meeting the minimum standards to redesign their services to align with national guidance and evidence-based practice. Specifically this means that those programmes not adhering fully to clinical and national guidance should:
    i. start CR earlier for all patient groups
    ii. carry out pre CR assessment early and use this data to tailor the intervention
    iii. ensure that the duration of CR is aligned with national guidance
    iv. complete and record an end of CR assessment (post CR)
    v. submit data on CR delivery and patient outcomes to the national audit

Actions:

1. The NACR, in collaboration with the BHF, will work with Strategic Clinical Networks in England, Health Trusts in Northern Ireland and Cardiac Networks in Wales to support them in achieving their ambitions for better care and prevention for all cardiovascular patients.
2. The BHF, the NACR and HSCIC will complete an ongoing feasibility study in Scotland which aims to enter the first set of data by June 2015.
3. The NACR and the HSCIC will work with programmes not submitting data to overcome barriers to direct data entry or data upload. This includes supporting programmes that use third party software to upload data.
4. The BHF and NACR will look to create resources including case studies from successful health regions and CR programmes. We would encourage CR programmes to use the BHF Alliance and the 'Innovative Service Redesign' support schemes to showcase good practice for the benefit of other programmes.
5. The BACPR and the NACR will soon commence a national CR certification programme, based on a set of minimum standards, aimed at acknowledging good practice and supporting service improvement. This will be a voluntary certification programme that we believe will help reduce inequalities in service delivery and assure the quality of care and improve outcomes for patients.

LIST OF TABLES

LIST OF FIGURES

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